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Indiana State Department of Health

Epidemiology Resource Center
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It's Not Stomach Flu

When symptoms strike, it may not be the latest "bug"--- It may be the food you ate

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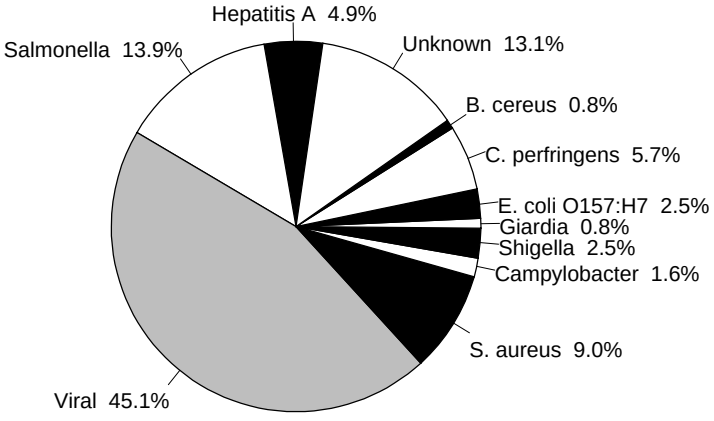
Foodborne illness is a major cause of personal stress, preventable death, and avoidable economic costs. The Centers for Disease Control and Prevention (CDC) estimate that 76 million food poisoning cases occur annually in the United States, resulting in approximately 5,000 deaths. The yearly cost of foodborne illness in terms of pain and suffering, reduced productivity, and medical costs is estimated at billions of dollars.

The majority of cases of foodborne illness probably goes unreported. Clusters of related illnesses may go undetected if infected individuals do not seek medical care. If those seeking medical care do not submit diagnostic cultures, the illness may not be recognized as possibly foodborne. In addition, symptoms of some types of foodborne illness can mimic those of other infections, or symptoms may not appear at all. This article will briefly describe some of the major causes of foodborne and waterborne illness, including those common to Indiana (Figure 1).

Agents of Reported Enteric Outbreaks*

Indiana, 1990-1999



*Laboratory and/or Epidemiologically Confirmed

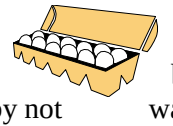
Recognized for its short incubation period, ***Staphylococcus aureus*** is a frequent cause of foodborne infection. Food can become contaminated with these bacteria if someone touches the nose or skin without washing hands and then handles food that is not subsequently cooked. If food is maintained at improper temperatures such as room temperature, or warm temperatures as food is held or cooling, the bacteria multiply and produce a toxin. Once ingested, the toxin causes the characteristic symptoms of vomiting, nausea, cramps, and diarrhea within 1-6 hours. Illness usually resolves without complications within 12-24 hours. Risk foods commonly associated with staphylococcal food poisoning include ham, poultry products, cream-filled pastries, and mayonnaise-based foods.

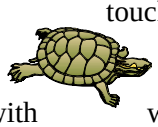


Three main types of ***E. coli*** commonly cause gastroenteritis. The bacteria are normally found in the gut of humans and cattle and are shed in the stool. Infection can result when food or water becomes directly contaminated or contaminated during preparation and then not subsequently cooked or treated. Although ground beef is a frequent vehicle of *E. coli* infection, many infections can be traced to contaminated lettuce, cabbage, sprouts, unpasteurized juices or apple cider, and contaminated water. Infection can also be transmitted from person-to-person by not washing hands after using the bathroom or diapering children and then touching others.


Enterotoxigenic (ET) strains cause a self-limiting illness marked by watery diarrhea and abdominal cramps within 12-72 hours after ingestion. ET strains are a major cause of travelers' diarrhea and diarrhea in infants. Enteroinvasive (EI) strains cause illness characterized by diarrhea (bloody or nonbloody), vomiting, fever, and cramps within 12-72 hours of ingestion. Dehydration can result from prolonged diarrhea and/or vomiting. Enterohemorrhagic (EH) strains, including ***E. coli* O157:H7** have gained much attention in recent years. These strains produce a potent toxin that resembles that of *Shigella* ("shiga-like" toxin). Following a typical incubation period of 2-5 days, the infection is marked by severe watery diarrhea, which may progress to grossly bloody diarrhea, severe abdominal cramps, and fever. In 2-7% of people who acquire infection, hemolytic uremic syndrome (HUS) may result. HUS is characterized by anemia, low platelet count, and kidney dysfunction, and requires hospitalization for treatment. In some cases, HUS can be fatal.

Salmonella infection is commonly known as a source of gastroenteritis. The bacteria are normally found in humans, birds (especially poultry), and reptiles, and are shed in stool or transmitted to developing eggs within an animal. Infection can result when food or water becomes directly contaminated, or contaminated during preparation and then not subsequently cooked or treated. Food sources of this bacterium include poultry, eggs, raw milk, and dairy products. Other foods such as raw vegetables and cereal can become contaminated during preparation. Infection can also be transmitted from person-to-person by not washing hands after using the bathroom, diapering children, handling raw meat, or handling pet reptiles, and then touching others. After ingestion, abdominal pain, diarrhea, nausea, vomiting, fever, and chills typically appear within 18-36 hours. The illness is generally self-limiting and does not require treatment. However, antibiotics may be recommended for infections that have spread or for those with weakened immune systems. One strain, *Salmonella typhimurium* DT104, has become resistant to several antibiotics.





While not commonly recognized, ***Campylobacter*** is the most common bacterial cause of diarrheal illness in the US. Animals such as dogs and cats can also be infected. Like salmonella bacteria, *Campylobacter* is normally found in poultry. Infection can result when food or water becomes directly contaminated with stool, and then is not cooked or treated. Food sources of *Campylobacter* include poultry, raw milk, and liver. Other foods such as raw vegetables can become contaminated during preparation. Infection can also be transmitted from person-to-person by not washing hands after using the bathroom, diapering children, handling raw meat, or handling ill dogs or cats, and then touching others. Symptoms of abdominal cramps, diarrhea (which may be bloody), fatigue, headache, muscle aches, fever, nausea, and vomiting appear usually 3-5 days after ingestion. The illness is generally self-limiting and does not require treatment. Rarely, following *Campylobacter* infection, some people may develop Guillain-Barre syndrome, which occurs when the body's own immune system attacks the nerves. This can lead to paralysis that lasts several weeks and requires hospitalization.

Unlike *E. coli*, *Salmonella* and *Campylobacter*, ***Shigella*** has no animal reservoir and thus no natural food sources. Only humans can acquire shigella bacteria, which are shed in stool. Infection can result when food or water becomes directly contaminated with stool, or contaminated by a foodhandler with inadequately washed hands, and then is not cooked or treated. Ready-to-eat foods such as salads are frequent vehicles. Infection is also easily transmitted from person-to-person by not washing hands after using the bathroom or diapering children, and then touching others. *Shigella* is extremely contagious; only 10-100 bacteria are needed to transmit infection. Households with young children and daycare centers are particularly at risk of spreading infection. Community-wide outbreaks can quickly develop if stringent hygiene practices and exclusion policies are not followed. Following an incubation period of 1-3 days, symptoms of abdominal pain, diarrhea (which may be bloody), nausea, vomiting, and fever appear. Mild infections usually resolve without treatment, but antibiotics are usually prescribed for severe cases. However, antibiotic resistance is increasing. Many strains in Indiana are resistant to ampicillin, and some are resistant to sulfa drugs. Multi-drug resistance has also been observed.

The majority of enteric outbreaks are attributed to viruses. **Caliciviruses**, including Norwalk virus, accounts for the majority of outbreaks investigated in Indiana. Until recently thought to be strictly human pathogens, caliciviruses also been found in stool of calves and pigs. It is not known if zoonotic transmission occurs. Like *Shigella*, infection can result when food or water becomes directly contaminated with stool, or contaminated by a foodhandler with inadequately washed hands, and then is not cooked or treated. Ready-to-eat foods, such as salads, are frequent vehicles. Infection is also easily transmitted from person-to-person by not washing hands after using the bathroom or diapering children, and then touching others. Caliciviruses are also extremely contagious; only 10 virus particles are necessary to transmit infection. The incubation period ranges from 12-60 hours, and averages 30-36 hours. Symptoms include vomiting, nausea, diarrhea, cramps, headache, and muscle aches, with little to no fever. The illness is generally self-limiting and does not require treatment. The largest enteric outbreak in Indiana history, which occurred in September 1999, was attributed to viral infection.

Other enteric viruses include **Hepatitis A** and **Hepatitis E.** Found exclusively in humans, hepatitis A is not endemic to the US, but infections often occur in clusters or outbreaks. Like *Shigella* and caliciviruses, hepatitis A infection can result when food or water becomes directly contaminated with stool, or contaminated by a foodhandler with inadequately washed hands, and then is not cooked or treated. Ready-to-eat foods such as salads are frequent vehicles. Infection is also easily transmitted from person-to-person by not washing hands after using the bathroom or diapering children, and then touching others. The incubation period ranges from 15-50 days, averaging 30 days. Maximal viral shedding occurs one week before to two weeks after onset of symptoms, which include fatigue, nausea, abdominal pain, diarrhea, dark urine, pale stools, fever, and jaundice. The illness is generally self-limiting with no carrier state, although some infections may require hospitalization. Hepatitis A immune globulin is available for those who have been exposed to infection or will be traveling to endemic areas. Hepatitis A vaccine is also available for those traveling to endemic areas. Recently, hepatitis A vaccine was recommended for routine childhood vaccination for those children living in high-risk regions of the US. This does NOT include Indiana.

Hepatitis E is very rare in the US, and almost always occurs in travelers to developing countries such as Mexico. The incubation period, symptoms, and mode of transmission are similar to hepatitis A. However, immuneglobulin and vaccine for hepatitis E are not currently available.

Usually found in contaminated water, ***Giardia*** is the most common enteric parasitic infection diagnosed in Indiana. Infection can result when food or water becomes directly contaminated with stool, or contaminated by a foodhandler with inadequately washed hands, and then is not cooked or treated. Ready-to-eat foods such as salads can also be vehicles. Infection is also easily transmitted from person-to-person by not washing hands after using the bathroom or diapering children and then touching others. Households with young children and daycare centers are particularly at risk of spreading infection. Incubation is typically 7-10 days, followed by diarrhea (pale, fatty stools), abdominal pain, bloating, nausea, vomiting, fever, fatigue, and weight loss. Infections are usually treated with antibiotics such as metronidazole (Flagyl).

Outbreaks of foodborne or waterborne diseases must be reported to the ISDH immediately upon suspicion. Diseases of unusual occurrence or increased frequency should also be reported. In addition, individual cases of various foodborne or waterborne diseases must be reported to the ISDH immediately, or within 72 hours. Please refer to the ISDH Communicable Disease Reporting Rule.

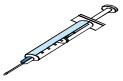
The ISDH Laboratories provide routine testing services for *Campylobacter, E. coli, Salmonella, Shigella, Giardia,* and hepatitis A. Isolates of *E. coli* O157, *Salmonella* and *Shigella* should be submitted for surveillance purposes. Testing for other agents is provided upon consultation with the laboratory. For information on submitting specimens for bacterial and parasitic agents, contact Ron Sanderson at 317-233-8036. For viral agents, contact Dave Dotson at 317-233-8050. Specimen mailing containers may be obtained from the ISDH Containers Section by calling 317-233-8104. Specimens must be properly collected and shipped (Table 1) or testing will not be performed.

Table 1.
Summary of Clinical Sample Submission
To ISDH Laboratories

	Bacterial Agents	Parasitic Agents	Viral Agents	Hepatitis A
Time to Collect	As soon as possible after illness onset	As soon as possible after illness onset	As soon as possible after illness onset; within 48-72 hours	As soon as possible after illness onset (if any)
Collection Container	ISDH 7A enteric	ISDH 4A parasitology	ISDH 7A enteric	ISDH 11B hepatitis
Storage after Collection*	Store at room temperature or refrigerate at 4°C (41°F) if shipping delayed longer than 12 hours. Do not freeze.	Store at room temperature. Do not freeze.	Immediately refrigerate at 4°C (41°F). Do not freeze.	Store at room temperature or refrigerate at 4°C (41°F) if shipping delayed longer than 12 hours. Do not freeze.
Transportation*	Secure container lids and send by overnight mail. Refrigeration is unnecessary.	Secure container lids and send by overnight mail. Refrigeration is unnecessary.	Keep refrigerated. Secure container lids and place in an insulated box on ice or with frozen refrigerant packs. Send by overnight mail.	Secure container lids and send by overnight mail. Refrigeration is unnecessary.

**If same specimens will be tested for both viral and bacterial agents, follow instructions for viral agents.*

Senior Vaccination Sunday



Stephanie Fang, RN
ISDH Communicable Disease Division

On October 10, 1999, fourteen health departments vaccinated Medicare-eligible seniors in an event called Senior Vaccination Sunday (SVS). Indiana's Senior Vaccination Sunday was modeled after a similar program in North Carolina designed to increase adult immunization rates.

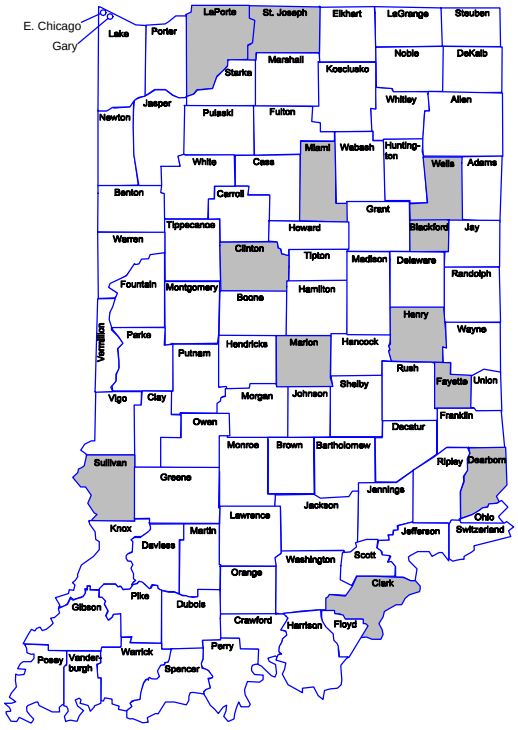
A total of 2,808 influenza vaccinations and 1,237 pneumococcal vaccinations were given and 9 health departments held immunization clinics at off-site locations. Promotional activities included advertising with posters, placing newspaper ads, and notifications in church bulletins.

In support of this project, the Indiana State Dept of Health (ISDH) provided the vaccine and registered as a Medicare provider and utilized roster billing to recoup the costs. The participating local health departments administered the immunizations as an agent of the ISDH. These health departments collaborated with the ISDH during the planning process, which enabled us to create an event that more effectively met Indiana's local health department needs. Overall, this was a successful event for the health departments that participated.

We plan to roll this event into Indiana's pandemic influenza plan, which is currently in the early stages of development. The information from SVS will assist the ISDH incorporate useable recommendations into the pandemic influenza plan (i.e., coordination of mass immunization clinics, community-wide involvement, publicity, etc.).

The SVS local health department participants were Blackford, Clark, Clinton, Dearborn, East Chicago, Fayette, Gary, Henry, LaPorte, Marion, Miami, St. Joseph, Sullivan, and Wells.

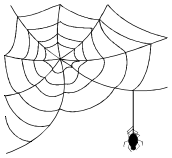
Participating Local Helth Departments
1999 Senior Vaccination Sunday



Pediatric Seroreverter Terminology Changed to "*Definitely Not Infected* (DNI)"

Children who are born to mothers infected with the human immunodeficiency virus (HIV) are exposed to the mother's virus. As a result, they may or may not become infected with HIV. All children born to HIV positive mothers will have a positive HIV antibody test when born because they have received the antibody from the mother. The mother's body made the antibody in response to having been infected with the virus. It is the antibody that is actually found when a test is done for HIV. If the child only obtains the antibody to the virus from the mother, and not the actual virus, the antibody will eventually disappear from the body and the child will test negative for the HIV antibody. When this happens, and it is confirmed that the child has no HIV virus in his/her body, the child has been designated as having "seroreverted". The term "seroreverter" has been used often in surveillance and epidemiology reports. This Centers for Disease Control and Prevention (CDC) and the Indiana State Department of Health (ISDH) will be changing this designation from seroreverter to **Definitely Not Infected (DNI).** It is expected that this will more clearly indicate that it has been clinically proven that the child is definitely not infected with the HIV. The term "HIV Negative Definitive" may also be used in CDC publications and is synonymous with the term "Definitely Not Infected (DNI)" for the same condition of not being infected with the HIV. We hope this will make it easier to identify those children who are born to HIV infected mothers and that who have not been infected with the virus themselves.

If a woman knows her HIV status, she and her health care provider can take a variety of steps during pregnancy and delivery to reduce the chances of actually giving the virus to her baby. If both mother and baby are treated, the chances are less than 10%. For this reason, we encourage every pregnant woman to find out if she is infected with HIV and work with her health care provider to reduce the chances that her baby will become infected.



Wonderful Wide Web Sites

ISDH Data Reports Available

The ISDH Epidemiology Resource Center has the following Indiana data reports and the Indiana Epidemiology Newsletter available on the ISDH Web Page:

http://www.state.in.us/isdh/ (under Data and Statistics)

Cancer Incidence Report (1990, 95)

Cancer Mortality Report (1990-94; 1992-96)

Diseases of Public Health Interest (1997, 98)

Fish Consumption Advisory (1998, 99)

Health Behavior Risk Factors (1995-96, 97, 98)

Hospital Consumer Guide (1996)

Immunization Reports:

- 1999 University Immunization Assessment Results
- 1998 & 99 Public Provider Immunization Assessmnts
- 1998 Summary Rpt on Oper. Program Reviews
- 1998 Immun. Coverage Levels in IN Pub. Hlth. Clinics

Maternal & Child Health Outcomes & Performance Measures Data Book (1988-97)

Mortality Report (1995, 97)

Natality/Induced Termination of Pregnancy/Marriage Report (1998)

Previous Reports:
Marriage Report (1995, 96, 97)
Natality Report (1995, 96, 97)

Tuberculosis (1996, 97, 98)

The following site allows access to the web page for any state health department in the United States:

http://www.polsci.wvu.edu/grad/klase/STATEHEALTH/sthlth.html

HIV Disease Summary

Information as of February 29, 2000 (population 5,840,528).

HIV - without AIDS to date:

262	New cases from March 1999 thru February 29, 2000	12-month incidence:	4.49 cases/100,000
3,141	Total HIV-positive, without AIDS on February 29, 2000[1]	Point prevalence:	53.78 cases/100,000[1]

AIDS cases to date:

334	New AIDS cases from March 1999 thru February 29, 2000	12-month incidence:	5.72 cases/100,000
2,478	Total AIDS cases on February 29, 2000[1]	Point prevalence:	42.43 cases/100,000[1]
5,762	Total AIDS cases, cumulative (alive and dead)		

[1] Counting only cases alive in January 1999

REPORTED CASES of selected notifiable diseases

Disease	Cases Reported in February		Cumulative Cases Reported through February	
	1999	2000	1999	2000
Campylobacteriosis	40	20	48	29
E. coli O157:H7	2	0	5	1
Giardiasis	36	61	45	74
Hepatitis A	10	2	12	3
Hepatitis B	4	0	4	1
Legionellosis	0	3	1	3
Lyme Disease	0	0	0	0
Meningococcal, invasive	3	10	6	14
Pertussis	1	2	1	2
Rocky Mountain Spotted Fever	0	0	0	0
Salmonellosis	29	37	32	45
Shigellosis	13	37	14	49
Tuberculosis	6	9	14	18
Animal Rabies	0	0	0	0

For information on reporting of communicable diseases in Indiana, call the *ISDH Communicable Disease Division* at (317) 233-7665.

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The *Indiana Epidemiology Newsletter* is published by the Indiana State Department of Health to provide epidemiologic information to Indiana health professionals and to the public health community.